

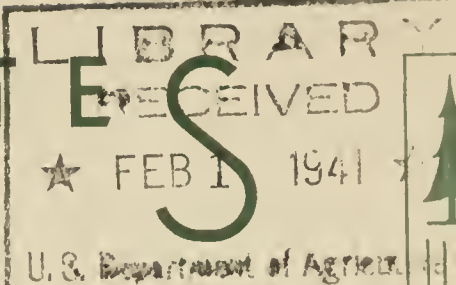
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# TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION  
UNIVERSITY FARM ST. PAUL, MINNESOTA



## Saving Soil Moisture for the Trees in the Northern Great Plains

The success of tree planting in the northern Great Plains depends on an adequate moisture supply. Since nothing can be done to increase the precipitation, the best plan is to conserve the available moisture as much as possible for the use of the trees. This can be achieved through the elimination of competing vegetation by cultivation.

The Station has experimented since 1934 with a number of implements and systems of cultivation. One of the methods used was to plow 5-foot-wide strips and alternate these with bands of undisturbed sod 2 to 3 feet wide to prevent excessive soil blowing. A horse-drawn disk cultivator was used to straddle the tree row and cultivation was done for 4 to 5 or more years. Survival was better by this method and growth improved considerably.

A few years later a Hester fire line disk plow was tried which plowed a furrow 3 feet wide and competition was reduced with a small one-horse cultivator. This type of ground preparation was fairly satisfactory for green ash, ponderosa pine, redcedar, and Chinese elm, but failed with the moisture-loving cottonwood.

In 1939 the system was tried out in which strips 100 or more feet in width were plowed in the fall and planted the following spring. Cottonwood was planted in a 9x9 spacing and cross checked, then cultivated both ways with a disk. This system gave excellent results in survival and growth during 1940 even with cottonwood, which is the problem species. There was no undue soil blowing and no hand hoeing was necessary.

As a measure of the moisture conservation of several methods of cultivation, soil-moisture values in the top 4 feet of soil were taken in August 1940, which is a critical period. The available moisture in sod was 0.6 percent, in Hester furrows 1.63 percent, and in cross-disked areas 3.30 percent. The average available soil moisture for late summer and fall was 2.0, 3.2, and 4.3 percent respectively.

Since the soil here is fine sand of the Valentine series, this difference in soil moisture is important and explains why survival and growth are so much better on the cross-cultivated areas.

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